Proposed CP-201 ISD Appendix
(To be Inserted as an Appendix to CP-201)
March 10, 2000

1. GENERAL REQUIREMENTS

1.1 All gasoline dispensing facility (GDF) vapor recovery systems shall be equipped with a diagnostic system that complies with the requirements in CP-201.

1.2 All GDF vapor recovery systems shall be equipped with a diagnostic system or device that will automatically prohibit the dispensing of fuel and will automatically inform the station operator in the event of a malfunction of a failure that substantially impairs the effectiveness of the system, subject to the implementation schedule described below.

1.3 All GDF vapor recovery systems shall be equipped with a diagnostic system or device that will automatically inform the station operator of equipment and system performance degradation.

1.4 All GDF vapor recovery systems shall also be equipped with a diagnostic system capable of identifying the likely area of the malfunction by means of fault codes stored in computer memory. These systems shall be equipped with a standardized electrical connector to provide access to the stored fault codes. Specific performance requirements are listed below, subject to the implementation schedule described below.

1.5 The manufacturer shall provide a means of testing and calibrating the sensors or devices installed on the GDF vapor recovery diagnostic system, including procedures for verifying that the system operates properly. These shall be verified and subjected to failure mode testing during the certification process.

1.6 Personnel trained by the company or individual requesting certification shall test the vapor recovery diagnostic system sensors or devices annually, at a minimum. All vapor recovery diagnostic system sensors or devices found to be not performing in conformance with the manufacturer's specifications shall be promptly repaired or replaced.

1.7 Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of the strategy and supporting data showing equivalent monitoring reliability and timeliness in fulfilling these requirements.

1.8 For the purpose of the implementation schedule, an existing facility is considered a new facility if greater than 50% of the existing vapor recovery system is modified, repaired, or replaced during the 4-year grandfathering provision in Health & Safety Code Section 41956.1.

2. MONITORING REQUIREMENTS

2.1 Air/Liquid (A/L) Ratio Monitoring

2.1.1 Requirement

The GDF vapor recovery diagnostic system shall monitor the A/L ratio for vacuum-assist vapor recovery systems.

2.1.2 Malfunction Criteria

The GDF vapor recovery diagnostic system shall prohibit dispensing from the affected dispenser and inform the station operator when an A/L of zero is detected.

The GDF vapor recovery diagnostic system shall prohibit dispensing from the affected dispenser and inform the station operator when an A/L ratio less than 75% of the nominal A/L ratio or greater than 125% of the nominal A/L ratio is detected.

2.1.3 Fault Code Storage

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of zero A/L, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, which dispenser was shut down, the dispenser fuel totalizer reading, and the reason the dispenser was shut down.

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of an A/L ratio outside the specified criteria, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, which dispenser was shut down, the dispenser fuel totalizer reading, and the reason the dispenser was shut down.

2.1.4 Alternative Strategies

Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of

the strategy and supporting data showing equivalent monitoring reliability and timeliness in detecting zero A/L.

2.1.5 Implementation Schedule

Implementation of the requirement to prohibit fuel dispensing when a zero A/L is detected is mandatory for all vapor recovery systems certified after April 1, 2001, and for all systems installed after April 1, 2001.

Implementation of the requirement to electronically record a fault code when a zero A/L is detected is subject to the implementation schedule described below:

2.1.5.1 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.1.5.2 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.1.5.3 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2001, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.1.5.4 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year and installed prior to April 1, 2002, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.1.5.5 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.1.5.6 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per year and installed prior to April 1, 2004,

implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.1.5.7 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

Implementation of the requirement to prohibit fuel dispensing when an A/L ratio outside the specified criteria is detected is mandatory for all vapor recovery systems certified after April 1, 2003, and for all systems installed after April 1, 2003.

Implementation of the requirement to electronically record a fault code when an A/L ratio outside the specified criteria is detected is subject to the implementation schedule described below:

2.1.5.8 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.1.5.9 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.1.5.10 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2001, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.1.5.11 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year and installed prior to April 1, 2002, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.1.5.12 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.1.5.13 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per

year and installed prior to April 1, 2004, implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.1.5.14 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

2.2 Blockage of the Vapor Return Line Monitoring

2.2.1 Requirement

The GDF vapor recovery diagnostic system shall detect blockage of the vapor return line between the nozzle and the dispenser for balance vapor recovery systems.

2.2.2 Malfunction Criteria

The GDF vapor recovery diagnostic system shall prohibit dispensing from the affected dispenser and inform the station operator when a blockage of the vapor return line is detected.

2.2.3 Fault Code Storage

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of a blockage of the vapor return line, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, which dispenser was shut down, the dispenser fuel totalizer reading, and the reason the dispenser was shut down.

2.2.4 Alternative Strategies

Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of the strategy and supporting data showing equivalent monitoring reliability and timeliness in detecting a blockage of the vapor return line.

2.2.5 Implementation Schedule

Implementation of the requirement to prohibit fuel dispensing when blockage of the vapor return line is detected is mandatory for all

vapor recovery systems certified after April 1, 2003, and for all systems installed after April 1, 2003.

Implementation of the requirement to electronically record a fault code when a blockage of the vapor return line is detected is subject to the implementation schedule described below:

2.2.5.1 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.2.5.2 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.2.5.3 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2001, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.2.5.4 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year and installed prior to April 1, 2002, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.2.5.5 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.2.5.6 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per year and installed prior to April 1, 2004, implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.2.5.7 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

2.3 Central Vacuum Unit

2.3.1 Requirement

The GDF vapor recovery diagnostic system shall verify the central vacuum unit is functioning properly.

2.3.2 Malfunction Criteria

The GDF vapor recovery diagnostic system shall detect failure of the central vacuum unit and prohibit dispensing from all affected fueling points. Fuel dispensing shall not commence until the vapor recovery system is repaired.

2.3.3 Fault Code Storage

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of a failure of the central vacuum unit, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, and the reason for shut down.

2.3.4 Alternative Strategies

Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of the strategy and supporting data showing equivalent monitoring reliability and timeliness in detecting a failure of the central vacuum unit.

2.3.5 Implementation Schedule

Implementation of the requirement to prohibit fuel dispensing when a failure of the central vacuum unit is detected is mandatory for all vapor recovery systems certified after April 1, 2001, and for all systems installed after April 1, 2001.

Implementation of the requirement to electronically record a fault code when a failure of the central vacuum unit is detected is subject to the implementation schedule described below:

2.3.5.1 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.3.5.2 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.3.5.3 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2001, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.3.5.4 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year and installed prior to April 1, 2002, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.3.5.5 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.3.5.6 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per year and installed prior to April 1, 2004, implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.3.5.7 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

2.4 Processor

2.4.1 Requirement

The GDF vapor recovery diagnostic system shall verify the processor is functioning properly.

2.4.2 Malfunction Criteria

The GDF vapor recovery diagnostic system shall failure of the central vacuum unit and prohibit dispensing from all affected fueling points. Fuel dispensing shall not commence until the vapor recovery system is repaired.

2.4.3 Fault Code Storage

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of a failure of the processor, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, and the reason for shut down.

2.4.4 Alternative Strategies

Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of the strategy and supporting data showing equivalent monitoring reliability and timeliness in detecting a failure of the central vacuum unit.

2.4.5 Implementation Schedule

Implementation of the requirement to prohibit fuel dispensing when a failure of the central vacuum unit is detected is mandatory for all vapor recovery systems certified after April 1, 2001, and for all systems installed after April 1, 2001.

Implementation of the requirement to electronically record a fault code when a failure of the central vacuum unit is detected is subject to the implementation schedule described below:

2.4.5.1 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.4.5.2 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.4.5.3 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2001, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.4.5.4 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year

and installed prior to April 1, 2002, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.4.5.5 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.4.5.6 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per year and installed prior to April 1, 2004, implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.4.5.7 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

2.5 UST Pressure Criteria

2.5.1 Requirement

The GDF vapor recovery diagnostic system shall monitor the pressure in the UST ullage.

2.5.2 Malfunction Criteria

The GDF vapor recovery diagnostic system shall detect failure of the UST pressure criteria specified in Table 4-1 of CP-201 and prohibit fuel dispensing from all affected fueling points. Fuel dispensing shall not commence until the vapor recovery system is repaired.

2.5.3 Fault Code Storage

When the GDF vapor recovery diagnostic system prohibits fuel dispensing due to a detection of a failure of the UST pressure criteria, a fault code unique to this type of failure will be stored in the computer memory, subject to the implementation schedule described below, listing the time, the date, and the reason for shut down.

2.5.4 Alternative Strategies

Subject to Executive Officer approval, other monitoring strategies may be used provided the manufacturer provides a description of the strategy and supporting data showing equivalent monitoring reliability and timeliness in detecting a failure of the UST ullage pressure requirements.

2.5.5 Implementation Schedule

Implementation of the requirement to prohibit fuel dispensing when a failure of the UST pressure criteria is detected is mandatory for all vapor recovery systems certified after April 1, 2003, and for all systems installed after April 1, 2003.

Implementation of the requirement to electronically record a fault code when a failure of the UST ullage pressure requirements is detected is subject to the implementation schedule described below:

2.5.5.1 For new facilities with a throughput greater than 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2003.

2.5.5.2 For new facilities with a throughput less than or equal to 900,000 gallons per year, implementation of electronically recording a fault code is effective for those facilities installed on or after April 1, 2004.

2.5.5.3 Subject to requirements, for existing facilities with a throughput greater than 3,600,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2005.

2.5.5.4 Subject to requirements, for existing facilities with a throughput greater than 1,800,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2006.

2.5.5.5 Subject to requirements, for existing facilities with a throughput greater than 900,000 gallons per year and installed prior to April 1, 2003, implementation of electronically recording a fault code is effective for those facilities after April 1, 2007.

2.5.5.6 Subject to requirements, for existing facilities with a throughput less than or equal to 900,000 gallons per year and installed prior to April 1, 2004, implementation of electronically recording a fault code is effective for those facilities after April 1, 2008.

2.5.5.7 The Executive Officer may allow alternative methods to demonstrate compliance with this requirement for new and existing facilities.

3. RECORDS

The GDF vapor recovery diagnostic system shall maintain an electronic record of periods of non-compliance for the last 24 calendar months, listing the time, the date, which dispenser was shut down (if applicable), the dispenser fuel totalizer reading (if applicable), and the reason fueling was prohibited from affected fueling points.

These periods of non-compliance shall be stored in such a manner as to be electronically accessed, such as downloading to a personal computer, or electronically transmitted, such as through a telephone modem, or printed on demand.

4. TAMPERING PROTECTION

The GDF vapor recovery diagnostic system sensors or devices shall be designed and installed in a manner designed to resist unauthorized tampering and to clearly show by visual inspection if tampering has occurred. The manufacturer shall submit measures to prevent tampering of the GDF vapor recovery diagnostic systems subject to Executive Officer approval.

5. READINESS/FUNCTION CODE

The GDF vapor recovery diagnostic system shall store a code upon first completing a full diagnostic check of all monitored components and systems. This is applicable when the GDF vapor recovery diagnostic system is initially installed or when power is restored.

6. STORED VAPOR RECOVERY SYSTEM CONDITIONS

Upon detection of a vapor recovery component or system failure the GDF vapor recovery system conditions shall be stored in computer memory. Stored GDF vapor recovery system conditions shall include, but are not limited to, the time, date, which dispenser was shut down (if applicable), the dispenser's fuel totalizer reading (if applicable), and the fault code which caused the data to be stored.

7. MONITORING SYSTEM DEMONSTRATION REQUIREMENTS

7.1 Requirement

The manufacturer shall demonstrate, to the satisfaction of the Executive Officer, that the GDF vapor recovery diagnostic system complies with the performance standards under actual field conditions and simulated failures as described below. The Executive Officer may, at his or her discretion, conduct or observe testing that demonstrates that the GDF vapor recovery diagnostic system complies with the performance standards under actual field conditions and simulated failures as described below.

The manufacturer shall submit test results with the certification application with the following components (as applicable).

7.2.1 Sensors or Devices to Detect Zero A/L Ratio

The manufacturer shall test the A/L sensor or device under actual operating conditions to check its ability to detect a zero A/L and the GDF vapor recovery diagnostic system's response to the zero A/L condition (i.e., did the GDF vapor recovery diagnostic system prohibit dispensing and inform the station operator as required). The second test, referred to as failure mode testing, shall include, but is not limited to, testing with an actual or simulated zero A/L to check the A/L sensor's or device's ability to detect a zero A/L and the GDF vapor recovery diagnostic system's response to the zero A/L condition.

7.2.2 Sensors or Devices to Detect Blockage of the Vapor Return Line

The manufacturer shall test the sensor or device under actual operating conditions to check its ability to detect blockage of the vapor return line and the GDF vapor recovery diagnostic system's response to the vapor return line blockage condition (i.e., did the GDF vapor recovery diagnostic system prohibit dispensing and inform the station operator as required). The second test, referred to as failure mode testing, shall include, but is not limited to, testing with an actual or simulated blockage of the vapor return line to check the sensor's or device's ability to detect a blockage of the vapor return line and the GDF vapor recovery diagnostic system's response to the vapor return line blockage condition.

7.2.3 Central Vacuum Unit

The manufacturer shall test the sensor or device under actual operating conditions to check its ability to detect a failure of the central vacuum unit and the GDF vapor recovery diagnostic system's response to a failure of the central vacuum unit (i.e., did the GDF vapor recovery diagnostic system prohibit dispensing and inform the station operator as required). The second test, referred to as failure mode testing, shall include, but is not limited to, testing with an actual or simulated failed central vacuum unit to check the sensor's or device's ability to detect the failed central vacuum unit and the GDF vapor recovery diagnostic system's response to the failed central vacuum unit condition.

7.2.4 Processor

The manufacturer shall test the sensor or device under actual operating conditions to check its ability to detect a failure of the processor and the GDF vapor recovery diagnostic system's response to a failure of the processor (i.e., did the GDF vapor recovery diagnostic system prohibit dispensing and inform the station operator as required). The second test, referred to as failure mode testing, shall include, but is not limited to, testing with an actual or simulated failed processor to check the sensor's or device's ability to detect the failed processor and the GDF vapor recovery diagnostic system's response to the failed processor condition.

7.2.5 UST Ullage Pressure

The manufacturer shall test the sensor or device under actual operating conditions to check its ability to detect a failure of the UST ullage pressure requirement and the GDF vapor recovery diagnostic system's response to a failure of the UST ullage pressure requirement (i.e., did the GDF vapor recovery diagnostic system prohibit dispensing and inform the station operator as required). The second test, referred to as failure mode testing, shall include, but is not limited to, testing with an actual or simulated failed UST ullage pressure requirement to check the sensor's or device's ability to detect the failed UST ullage pressure requirement and the GDF vapor recovery diagnostic system's response to the failed UST ullage pressure requirement condition.

7.2.6 Alternative Strategies

The Executive Officer may approve other demonstration protocols if the manufacturer can adequately show comparable assurance that the malfunction criteria are chosen based on meeting emission

requirements and that the timeliness of malfunction detections are within the constraints of the applicable monitoring requirements.

8. DESCRIPTION OF GDF VAPOR RECOVERY DIAGNOSTIC SYSTEM

The manufacturer shall submit the following documentation with the certification application. With Executive Officer approval, one or more of the documentation requirements specified in this section may be waived or altered if the information required would be redundant or unnecessarily burdensome to generate.

Description

A written description of the functional operation of the GDF vapor recovery diagnostic system shall be included with the manufacturer's certification application.

A table providing the following information for each monitored component or system, as applicable:

(A) corresponding fault code
(B) monitoring method or procedure for malfunction detection
(C) primary malfunction detection parameter and its type of output signal
(D) fault criteria limits used to evaluate output signal of primary parameter
(E) other monitored secondary parameters and conditions (in engineering units) necessary for malfunction detection
(F) monitoring time length and frequency of checks
(G) criteria for storing fault code
(H) criteria for notifying station operator
(I) criteria used for determining out of range values and input component rationality checks

A logic flowchart describing the general method of detecting malfunctions for each monitored emission-related component or system.

A written detailed description of the manufacturer's recommended Inspection and Maintenance procedures, including inspection intervals, shall be submitted for approval by the Executive Officer.

A written detailed description of the training plan to train and certify system testers, repairers, installers, and rebuilders.

A written description of the manufacturer's recommended Quality Control checks.

9. FAILURE MODE TESTING

The Executive Officer shall perform failure mode testing of manufacturers' GDF vapor recovery diagnostic systems for compliance with requirements of this section in accordance with malfunction criteria submitted in the manufacturers' approved certification documentation. Appropriately deteriorated or malfunctioning components in an otherwise properly functioning vapor recovery system shall be installed in order to test the diagnostic system for a zero A/L, blockage of the vapor return line, a failed central vacuum pump (if applicable), a failed processor (if applicable), a failure of the UST ullage pressure requirements, and other components which can affect emissions.

10. STANDARDIZATION

The GDF vapor recovery diagnostic system shall have a standard data link connector in a standard location for on-site (e.g., through a laptop PC) and remote download capability (e.g., the console will have an RS232 interface port accessible on the exterior of the console for telephone modem access).

11. SIGNAL ACCESS

The following signals, as applicable, shall be made available on demand through the serial port on the standardized data link connector: each dispenser's A/L ratio status, blockage of the vapor return line status, central vacuum pump operational status, processor operational status, and UST ullage pressure.